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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,466	11/13/2003	Yoshihiro Okada	81784.0294	9432

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EXAMINER

DURNFORD-GESZVAIN, DILLON

ART UNIT	PAPER NUMBER
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2622

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/712,466	Applicant(s) OKADA, YOSHIHIRO	
	Examiner Dillon Durnford-Geszvain	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figures 5-7 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show "light receiving pixel(s)" as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several

views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "light receiving pixel" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

It is unclear from the drawings how transfer electrodes 12-1 to 12-3 correspond to a light receiving pixel. It is further unclear how they could possibly correspond to a light receiving pixel if they are constructed as shown in Fig. 1 as the transfer electrodes would almost certainly cover any light receiving portion.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by US 4,696,021 (Kawahara et al.).

As to claim 1, Kawahara et al. teaches a solid state imaging device comprising: channel regions 32 (see Figs. 2A and 2B) of one conductivity type arranged to extend along a first direction in parallel to each other with predetermined intervals on one surface of a semiconductor substrate; a plurality of drain regions 2 of the one conductivity type at high density, which are arranged to extend along the first direction

Art Unit: 2622

between adjacent channel regions (see Figs. 2A and 2B); a plurality of separation regions disposed 6' in the interval between one of the channel regions and one of the drain regions (see Figs. 2A and 2B); and a plurality of transfer electrodes ($\Phi 1$ - $\Phi 4$) arranged in parallel to each other to extend along a second direction which intersects the first direction on the semiconductor substrate (see Figs. 2A and 2B), wherein the width of the separation region is narrower (the regions between the regions 6' in the vertical direction) in a region beneath at least one transfer electrode in each predetermined set of transfer electrodes than in a region beneath the remaining transfer electrodes in the set of transfer electrodes (Note that although the transfer electrodes of Kawahara et al. are not shown as being directly over the narrower region, the Examiner does not believe that the positioning of the narrower region under a transfer electrode is the inventive feature of the present invention, but it is the narrower region that is the inventive feature and this is clearly shown by Kawahara et al.).

As to claim 2, Kawahara et al. further teaches a solid state imaging device according to claim 1, wherein each set of a predetermined number of transfer electrodes (2) among the plurality of transfer electrodes defines a single light receiving pixel in each of the plurality of channel regions (see Fig. 2A).

As to claim 3, Kawahara et al. teaches a method of driving a solid state imaging device comprising a plurality of channel regions arranged on one surface of a semiconductor substrate in parallel to each other and separated by predetermined

Art Unit: 2622

intervals, a plurality of drain regions each provided between the adjacent channel regions, a plurality of separation regions each provided in an interval between one of the channel regions and one of the drain regions, and a plurality of transfer electrodes provided on the semiconductor substrate, the width of the separation region being narrower in a region beneath at least one transfer electrode in each predetermined set of transfer electrodes than in a region beneath the remaining transfer electrodes in the set of transfer electrodes (see the rejection of claim 1 for the composition of said solid state imager), the method comprising the steps of: rising a first clock pulse to be applied to a transfer electrode $\Phi 1$ which is formed on the part of the separation region having a narrower width in order to accumulate information charges in the channel region adjacent to the part of the separation region having the narrower width (see Fig. 4); and applying a clock pulse which periodically changes potential to the plurality of transfer electrodes in order to transfer the information charges accumulated in the above accumulation step (this corresponds to the phase driving the channel region, which is inherent for this type of imager).

As to claim 4, see the rejection of claim 3 and note that Kawahara et al. further teaches a method of driving a solid state imaging device according to claim 3, further comprising, during the transfer step, the step of: rising a second clock pulse to be applied to the drain region while the first clock pulse is held at high level in order to discharge a portion of the information charges accumulated in the accumulation step into the drain region and limit the amount of charges accumulation in the channel region

(see Fig. 4).

As to claim 5, see the rejection of claim 3 and note that Kawahara et al. further teaches a method of driving a solid state imaging device according to claim 3, further comprising the step of: lowering the first clock pulse and rising the second clock pulse applied to the drain region in order to discharge the information charges accumulated in the accumulation step into the drain region (see Fig. 4).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dillon Durnford-Geszvain whose telephone number is (571) 272-2829. The examiner can normally be reached on Monday through Friday 8 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ngoc-Yen Vu can be reached on (571) 272-7320. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Dillon Durnford-Geszvain

4/1/2007

A handwritten signature in black ink, appearing to read 'Ngoc-Yen Vu', with a long horizontal line extending to the right.

NGOC-YEN VU
SUPERVISORY PATENT EXAMINER